Lesson no. 26 Heena (Mehndi)



Heena is a very well known herb, famous for its medical properties, applying of hair, nails, hands & feet on wedding, occasions, festivals etc. It is used for many purposes; it is also used as internal medicine for many diseases; it is easily available all over the world; specially used by women to apply on their nails, hair & design on their hands & feet; its botanical name is Lawsonia inermis & belongs to Lythraceae family; it is mentioned in many book of Hadith & was used by Prophet Muhammad (s.a.w) to apply to hair, wounds or prick with thorn, for headache; for detail Islamic study on Henna please read my English book Tibb e Nabawi lesson no. 50 page 145 onwards or visit my website www.tib-e-nabi-for-you.com or direct link on lesson henna http://www.tib-e-nabi-for-you.com/heena.html

- **NAMES OF HEENA (الحنــاء) : -**

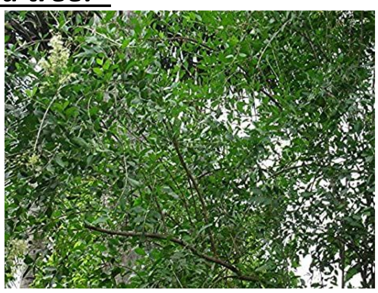
1. In Hadees it is called as Heena (الحنــاء)
2. In Urdu it is called as Heena.
3. Latin name is Lawsonia inermis.
4. English name is Henna.
5. Hindi name is Mehndi.
6. It belongs to Lythraceae family.

It is mentioned in following books of Hadith (names of book of Hadith & reference are also given): -

Bukhari : 5897, 5899; Tirmizi : 2192; Muslim : 2341 A; Ibn Majah : 3502, 3753; An-Nasai : 5075, 5089, 5242; Abu Dawud : 3858; Shama'il Muhammadiyah : 46 (book 6); Kanzul-ummal : 17316, 28282.

Basic encyclopedia of henna: -

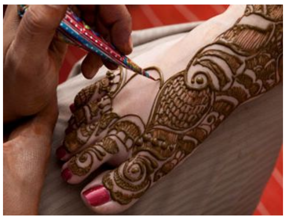
- ***Henna tree: -***





Henna is a tall shrub or small tree, standing 1.8 to 7.6 m tall (6 to 25 ft). It is glabrous and multi-branched, with spine-tipped branchlets. It is called as Lawsonia inermis in Latin; it is the only species in its genus. It is a member of Lythraceae family that includes crepe myrtles (Lagerstroemia), cigar plants (Cuphea), and pomegranates (Punica); it has many common names, including mignonette tree and Egyptian privet. It is most commonly known as henna, a term that refers to the plant itself, the dye derived from the plant, and the body art made using the dye. Henna has been used to dye the skin, nails, and hair of women and men in many cultures and religions across its area of natural distribution and beyond. Its use has been especially common among women as part of fertility and marriage celebrations. The henna plant is native to northern Africa, Asia, and northern Australia, in semi-arid zones and tropical areas. It produces the most dye when grown in temperatures between 35 and 45 °C (95 and 113 °F). During the onset of precipitation intervals, the plant grows rapidly, putting out new shoots. Growth subsequently slows. The leaves gradually yellow and fall during prolonged dry or cool intervals. It does not thrive where minimum temperatures are below 11 °C (52 °F). Temperatures below 5 °C (41 °F) will kill the henna plant. Henna thrives in dry environments with poor soil; however, it does not tolerate frost. It occurs in tropical and subtropical regions of Africa, western and southern Asia, and northern Australasia. Cultivation by humans has broadened its distribution well beyond its original boundaries.

Henna continues to be used in cultures across the world and is particularly prominent in Hinduism and Muslim practices. It is most commonly used to dye hair and create temporary body art (also known as Mehndi). Henna art is often applied to the hands and feet, where the skin is thick and absorbs more of the lawsone. It is applied as a paste and either squeezed through a plastic cone or syringe or painted on with a stick or brush. The longer the paste is left on, the darker the stain will be. After a week or so the henna begins to fade as old skin cells slough off. Its bark is grayish brown in colour.





- ***<u>Henna leaves: -</u>***





The leaves are smooth; grow opposite each other that are spine-tipped on the stem. They are glabrous, sub-sessile, elliptical, and lanceolate (long and wider in the middle; average dimensions are 1.5–5.0 cm x 0.5–2 cm or 0.6–2 in x 0.2–0.8 in), acuminate (tapering to a long point), and have depressed veins on the dorsal surface. Dyes are made by crushing dried leaves into a fine powder and then mixing it into a paste using water, lemon juice, tea, or other liquids. A soap or shampoo is produced when henna is mixed with plant extracts containing saponin, and the addition of certain essential oils can enhance the performance of the dye. The compound in the leaves that produces the red-orange dye is called **lawsone** and is found in varying concentrations depending on the conditions in which the plant was grown. High heat and low soil moisture is said to produce the highest levels of lawsone. More than just a dye, lawsone also has antifungal properties and strongly absorbs UV light, thus its application is beyond cosmetic as it has proven useful against fungal diseases like athlete's foot and as a sunscreen.

- ***Henna flowers: -***



Inflorescences are many-branched with numerous small, fragrant flowers. The most prominent features of the flowers are four sepals forming a bowl shape and several white to red stamens reaching towards the sky; and have a 2 mm (0.079 in) calyx tube, with 3 mm (0.12 in) spread lobes. Its petals are ovate, with white or red stamens found in pairs on the rim of the calyx tube. The ovary is four-celled, 5 mm (0.20 in) long, and erect. Flowers are white or pink coloured.

- ***Henna fruits (pod): -***



Henna fruits are small, round, brownish capsules full of tiny seeds; size is 4–8 mm (0.16–0.31 in) in diameter; with 32–49 seeds per fruit, and open irregularly into four splits.

- ***How to know about the purity of heena: -***



Pure heena powder has aroma of henna, colour is green called as mehndi colour, powder will be soft to touch & smooth; these are few test for known about purity of henna: -

1. **The sand test:** Place a pinch of henna between 2 glass surfaces. If you hear a scratching sound and/or the glass has been scratched, there is added sand in your henna powder. Adding sand is a technique used by some vendors to stretch their henna powder to make more profit.
2. If your henna powder **looks abnormally bright green**, and a green dye pools after you've mixed the powder with water, there is green dye added to the powder.
3. **Mix up a teaspoon of henna**, with warm water and dye some loose shed hairs with it. When the hair has been dyed, mix 1 ounce of 20 vol peroxide with 20 drops of ammonia. Add the hair strands to this solution. If nothing happens, you have pure henna. If the hair strands turn green, melt, boil, change colour immediately, or smells strange (not like grass), then that henna has been tainted with metallic salts.

- ***Adulteration in henna: -***

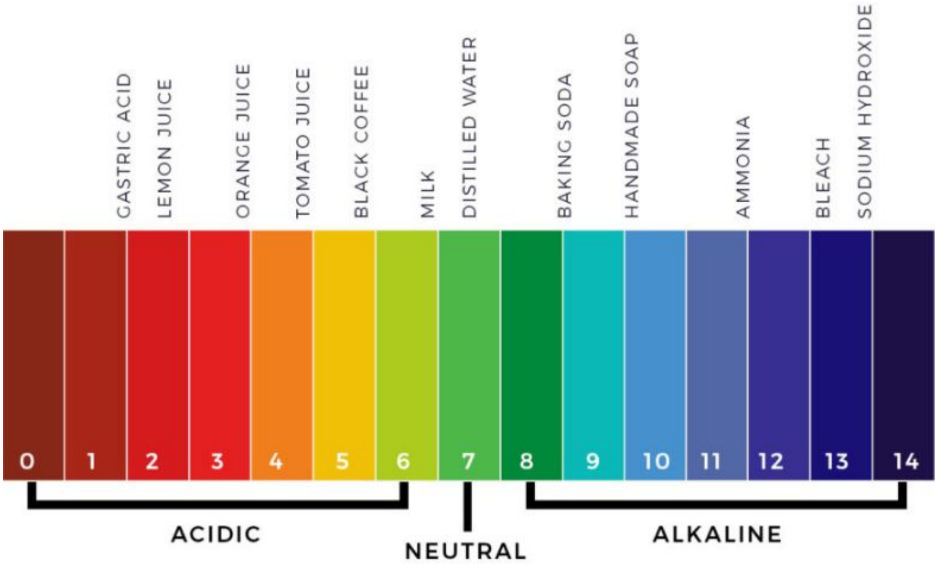
In pure henna following things may be mixed to increase the profit & cheat: stem, dirt, plants waste, other plants, leaves of other plants; in henna powder dyed sand or fine ground local sand etc are mixed; the adulteration material are first dyed with auramine yellow & than green with diamond green & mix in pure henna powder.

- ***pH of heena is: -*** 5.5 when mixed in right proportion; it is little acidic because its pH is less than 7 & pH of our skin & hair is also 5.5. .

pH is a measure of hydrogen ion concentration, a measure of the acidity or alkalinity of a solution. The pH scale usually ranges from 0 to 14. Aqueous solutions at 25°C with a pH less than 7 are acidic, while those with a pH greater than 7 are basic or alkaline & 7 is neutral; only aqueous solutions have pH levels, vegetable oil has no pH value. Likewise, other oils such as animal and petrochemical oils also have no pH value. Fatty acids are organic molecules often found in foods, including vegetable oils.

The pH of pure water is 7. In general, water with a pH lower than 7 is considered acidic, and with a pH greater than 7 is considered alkaline. The normal range for pH in surface water systems is 6.5 to 8.5, and the pH range for groundwater systems is between 6 and 8.5. We can add normal water to reduce the acidity.

It is Sunnat of Prophet Muhammad (s.a.w) to mix acidic with Alkaline to make it neutral or less acidic that why He use eat dates with watermelon or cucumber or dry dates with little butter; so you can mix one acidic with alkaline; also it is Sunnat to drink honey mixed in water; also dates or raisins soaked in water over night & drink the syrup (sharbat). Remember do not soak dates & raisin together at one time; soak at separate time & drink.



- ***<u>Calories of heena: -</u>*** we do not intake heena in large quantity we take it in medicinal dose for a short period.
- ***<u>Glycemic index & Glycemic load: -</u>*** heena is not a regularly eatable; we take it in minor doses so glycemic index & load does not matter in case of henna.
- ***<u>Gross health benefits of heena : -</u>***

Heena is antiviral, antifungal, antibacterial, antioxidant, a detox for internal body when intake; antifungal & antibacterial for hair, nails skin, wounds & lesions. Pure heena is safe & harmless to be used on hair, beards, skin, wound & lesions; it strengthens the skin of scalp & hair; good for burns (water boiled with henna can be applied on burns); it gives soothing effect, reduces pain, good for psoriatic nail, fungal infection on nails, hair dandruff, lice, nits, good for gout when applied externally, fungal infection between toes; it increases urine output; helpful in kidney stones, promotes healing, reduces sweating, good for gastrointestinal infections etc.

<u>Part used: -</u> Henna leaves, soft stem, pods & flower.

Person suffering from G6PD deficiency should not use heena internally or orally it is contraindicated.

- ***<u>Clinical pharmacology of henna: -</u>***
- **TABLE 1: TRADITIONAL USES**

Plant Parts	Traditional Uses (as/in)

Leaves	Bitter, astringent, acrid, diuretic, emetic, edema, expectorant, anodyne, anti-inflammatory, constipating, depurative, liver tonic, haematinic, styptic, febrifuge, trichogenous, wound, ulcers, strangury, cough, bronchitis, burning sensation, cephalalgia, hemicranias, lumbago, rheumatalgia, inflammations, diarrhoea, dysentery, leprosy, leucoderma, scabies, boils, hepatopathy, splenopathy, anemia, hemorrhages, hemoptysis, fever, ophthalmia, amenorrhoea, falling of hair, greyness of hair, jaundice.
Flower	Cardio-tonic, refrigerant, soporific, febrifuge, tonic, cephalalgia, burning sensation, cardiopathy, amentia, insomnia, fever
Seed	Antipyretic, intellect promoting, constipating, intermittent fevers, insanity, amentia, diarrhea, dysentery and gastropathy.
Root	Bitter, depurative, diuretic, emmenagogue, abortifacient, burning sensation, leprosy, skin diseases, amenorrhoea, dysmenorrhoea and premature graying of hair.

Pharmacological Activities: Several researchers have reported the different pharmacological activities of *L. inermis* which are discussed below.

Analgesic and Antipyretic Activity: The ethanolic extract of leaves of Lawsonia showed significant analgesic as well as antipyretic activity. The fixed oil obtained from seeds were screened for pharmacological activity both *in-vitro* and *in-vivo.* It was concluded that seed oil is devoid of behavioral and CNS effects and failed to produce any effect on isolated tissue though it possess significant analgesic activity.

Anti-Inflammatory Activity: Methanol extract of *Lawsonia inermis* flowers showed a good anti-inflammatory activity against 5-Lipoxygenase. It may be interpreted that the greatest anti-inflammatory activity was due to the high amounts of total phenolic compounds.

Isoplumbagin and lawsaritol, isolated from stem bark and root of *L. inermis* screened for anti-inflammatory activity against carrageenan induced paw edema in rats. The results showed that isoplumbagin exhibited significant activity, was compared to that of phenylbutazone.

Butanol and chloroform fractions showed potent anti-inflammatory, analgesic and antipyretic effects that aqueous fraction of crude ethanol extract of *L. inermis* in a dose dependent manner. Leaves showed significant anti-inflammatory effect with some active principles.

Antiarthritic Activity: Aqueous and ethanol leaf extract demonstrated anti-arthritic activity, as reflected by a reduction in paw oedema, paw diameter and body weight loss in both Freund's adjuvant-induced and formaldehyde-induced arthritis mice models, at doses of 200 and 400 mg/kg p.o., respectively. In this study, an oral dose of 10 mg/kg of diclofenac sodium was used as the positive control.

Anti-ulcer Activity: Aqueous, ethanol and chloroform leaf extracts showed a strong anti-ulcer activity in pylorus ligation- and aspirin-induced rats when compared to ranitidine, the positive control. In addition, significant reductions (p.o. = 0.001) in gastric acid secretions, total acidity and ulcer index were observed. Aqueous, ethanolic and chloroform extracts produced significant activity against acute and chronic gastric ulcers in two rat models at doses of 200 and 400 mg/kg p.o. when compared to the negative control gum acacia (2%, w/v). Sucralfate (250 mg/kg) served as the positive control. Aqueous, ethanolic and chloroform extracts were found to reduce ethanol-induced ulcers by up to 81, 94 and 88%, respectively, and cold-restraint stress-induced ulcers by up to 56%, 30% and 56%, respectively.

Ethanolic leaf extract showed antiulcer activity in indomethacin-induced gastric ulcers in pylorus ligation rat models by reducing the ulcer index for all three doses (100, 200 and 400 mg/kg p.o.) tested.

Anti-diabetic activity: The ethanolic extract of leaves of *Lawsonia inermis* linn (400mg/kgBW) in alloxan induced diabetic rats showed significant hypoglycaemic activity after oral administration.

Ethanolic extract of *Lawsonia inermis* (500mg/kg body weight) significantly decreased level of blood glucose in streptozotocin induced diabetic rats.

Ethanol (70 %) extract of *L. inermis* showed significant hypoglycemic and hypo-lipidemic activities in alloxan induced diabetic mice after oral administration. The feeding of 0.8 g/kg of *L. inermis* extract decreased the concentration of glucose, cholesterol and triglycerides to normal. Methanol (95 %) extract of leaves of *L. inermis* showed significant *in-vitro* anti-hyperglycemic effect.

Antibacterial activity: Antibacterial activity of aqueous, methanol extracts of Yemeni henna (*Lawsonia inermis*) leaves were tested against three bacterial species including (*Staphylococcus aureus, Escherichia coli, Pseudomonas aeruginosa*) using agar diffusion and minimum inhibitory concentration (MIC) as a determination method. Preliminary phyto-chemical screening revealed the presence of Alkaloids, Quinones, Glycosides, Tannins and saponins. The mehanolic extract displayed a potential antibacterial activity against all the bacterial species, than the aqueous extract.

- ***Heena oil: -***

Henna hair oil is also known as mehndi oil; its oil is extracted from henna leaves or flower or seeds or all three mix; it is very beneficial for hair, wounds, lesion; it is antiviral, antibacterial, antifungal; promotes hair growth & improves the quality of hair & skin; removes dandruff, nits & lice.

- ***Modern uses of it: -***

It can be taken orally with water on empty stomach. Also it can be applied on hairs, beards, nails, wounds, ulcers, lesions etc. (its dry powder or paste can be applied). Henna water can be applied on burns. Always use in mild quantity. Soak some coffee, tea powder, kattah (used in paan) and water of pomegranate, nilgiri (soak some skin of pomegranate in little water over night & use this water) over night, than boil them in mourning on low flame for 10 minutes, than mix henna powder in the same water and keep it covered for 3 hours than add little nilgiri oil (eucalyptus oil), lemon juice and 1 or 2 egg in it & again keep it covered for more 2 hours and then apply on hair and breads. 21. Keep for 3 to 4 hours applied on hair, beards etc.

Henna, Amla, Shikakai and Brungraj Pack

Benefits of henna for hair are well known, but all the rest of the ingredients used in this pack are also extremely beneficial for hair growth and healthy hair and are widely used in Ayurveda for treating hair and scalp problems.

Ingredients:

Henna powder-2 cups, Amla powder-1/2 cup, Shikakai powder-2spoons, Egg white-1, Lemon juice-2spoons, Tulsi powder-1spoon, and Brungraj powder-1spoons

Procedure:

Mix together all the above at night with tea or coffee decoction and apply this mixture next day morning completely to your hair and rinse after 45 minutes –1 hour. Cover your hair with some plastic cap. So that it keeps your hair moist so that color will absorb quickly.

Henna, Coffee and Beetroot Pack

This is one of the best henna pack for hair and a side-effect free grey hair solution that contains the proteins and vitamins of eggs and lemons and provides a natural burgundy color to the hair that looks exactly like salon coloring.

Ingredients:

Henna – 2 Cups, Tea Liquor for mixing, Lemon Juice – 1 Whole Lemon, Egg White – 1 (Optional), Coffee Powder – 2tbsp & Beet Root Juice – 1 cup.

Procedure:

The most important thing to have gorgeous hair with henna is to select the right quality henna from a good brand. Now, pour the henna in an iron bowl and start pouring the tea liquor and mix continually, so there are no lumps. Next, add the coffee powder. It is preferable to use iron vessel because it allows the henna to oxidize and provide a rich and deep tint. Soak the mixture overnight. The following day before applying the henna, add the egg white, lemon juice, and beetroot juice. Mix well and apply the henna on hair evenly. Keep the pack for 2 to 3 hours, Wash away the henna with plain water and then wash hair with a mild shampoo.

- ***Active ingredient of heena: -*** Lawsone (it is similar to tannin, it gives red-orange colour & has health benefits also.
- ***Contents/constituents of different parts henna plant: -***

Leaves: Lawsone 2-Hydroxy-1, 4-napthoquinone is the principle natural dye contained at 1.0 -1.4 % in the leaves of Henna. Other related compounds present in the leaves are: 1, 4dihydroxynaphthalene, 1,4-naphthoquinone, 1,2-dihydroxy-glucoyloxy naphthalene and 2-hydroxy-1,4-diglucosyloxy naphthalene. Flavonoids like luteolins, apigenin; coumarins like esculetin, fraxetin, scopletin; steroids (β-sitosterol); also soluble matter tannin, gallic acid, glucose, mannitol, fat, resin and mucilage.
Bark: Bark contains napthoquinone, isoplumbagin, triterpenoids, hennadiol, aliphatics (3-methyl nonacosan-1-ol).
Flower: Flowers on steam distillation gave an essential oil (0.02 %) rich in ionones (90 %) in which β-ionones predominated.
Root: Aqueous root extract of *L. inermis* contains alkaloids, saponins, steroids, cardiac glycosides, flavonoids, tannins and reducing sugars.
Oil & seeds: carbohydrate 33.62%, protein 5%, fiber, benenic acid, arachidic acid, stearic acid, palmitic acid, oleic acid, linoleic acid.

- ***Each content/constituents explained separately: -***
- ***Lawsone: -***

Lawsone (2-hydroxy-1,4-naphthoquinone), also known as hennotannic acid, is a red-orange dye present in the leaves of the henna plant (Lawsonia inermis) as well as in the flower of water hyacinth (Eichhornia crassipes). Humans have used henna extracts containing **lawsone** as hair and skin dyes for more than 5000 years. Lawsone reacts chemically with the protein keratin in skin and hair, in a process known as Michael addition, resulting in a strong permanent stain that lasts until the skin or hair is shed. The darker colored ink is due to more lawsone-keratin interactions occurring, which evidently break down as the concentration of lawsone decreases. Lawsone is the phyto-chemical constituent of henna leaves, (and hence henna powder) that is responsible for creating the henna stain. The higher the lawsone content, the deeper will be the stain. On average the lawsone content of 'good quality' henna powder is somewhere between 1% and 2%. The higher the temperature where the henna is cultivated is directly proportionate to the Lawsone content of the leaves. The higher the temperature, the higher the lawsone content in its leaves. This is why it is probably no surprise that the best quality henna powders come from some of the hottest regions of the world.

- ***Naphthoquinone: -***

Naphthoquinone is a class of organic compounds structurally related to naphthalene. Two isomers are common for the parent naphthoquinones; natural naphtoquinones include juglone, plumbagin, droserone. Naphthoquinone derivatives have significant pharmacological properties. They are cytotoxic, they have significant antibacterial, antifungal, antiviral, insecticidal, anti-inflammatory, and antipyretic properties & also anti-tuberculosis. This makes henna helpful in tuberculosis.

- ***Hennadiol: -***

Hennadiol is a natural triterpenoid found in the herbs of Mallotus apelta & henna; it is under research.

- ***Behenic acid: -***

It has a very long-chain of saturated fatty acids; it is also called as docosanoic acid.

Main sources of behenic acid: -

It is present in pumpkin seed oil, moringa oleifera seed oil, rape seed oil, peanut oil etc.

Basic pharmacokinetics of behenic acid (based on human intake in natural food products): -

It is poorly absorbed in human body; its absorption, metabolism & excretion are yet not known & are under research.

Basic clinical pharmacology of behenic acid: -

It is smooth & moisturizing in nature thus good & helpful for skin & hair.

- ***Esculetin: -***

Esculetin is a natural plant phenolic that shares features of coumarins and catechols. It inhibits lipoxygenases (LOs), including 5-LO and 12-LO (ID_{50}s = 4 and 2.5 µM, respectively). This action is likely

due to its ability to bind iron, as it also inhibits other iron-containing enzymes, including the lysine-specific demethylase KDM5B.

- ***Ionones: -***

The terpene, β-ionone is largely responsible for the pungent odour of the essential oil isolated from the flowers. Both beta & alpha are present in henna flower oil; it is under research.

- ***Fraxetin: -***

Fraxetin is an O-methylated coumarin. It can be found in Fraxinus rhynchophylla. Fraxin is a glucoside of fraxetin. It has a role as an Arabidopsis thaliana metabolite, an antimicrobial agent, an apoptosis inhibitor, an apoptosis inducer, an antioxidant, an anti-inflammatory agent, a hepato-protective agent, an antibacterial agent and a hypoglycemic agent.

- ***Scopoletin: -***

Scopoletin is a coumarin. It is found in the root of many plants; scopoletin seems to regulate the blood pressure: when the blood pressure is high, scopoletin helps to normal it; it also has bacteriostatic activity against various species of bacteria, including Escherichia coli, Staphylococcus aureus, Streptococcus sp., Klebsiella pneumoniae and Pseudomonas aeruginosa. It has anti-inflammatory activity and can be used to treat bronchial illnesses and asthma. Scopoletin regulates the hormone serotonin, which helps to reduce anxiety and depression.

- ***Isoplumbagin:-***

Plumbagin or **5**-hydroxy-**2**-methyl-1,4-naphthoquinone is an organic compound; plumbagin has been shown to induce cell cycle arrest and apoptosis in numerous cancer cell lines including melanoma, lung, breast and others. It triggers autophagy via inhibition of the Akt/mTOR pathway and induces G2/M cell cycle arrest and apoptosis in A549 cells through JNK-dependent p53 Ser15 phosphorylation. It is anticancer, anti-inflammatory, antibacterial; it is under research.

- ***Natural mannitol: -***

Mannitol is a type of carbohydrate called as sugar alcohol; it contains about 60 percent fewer calories than sugar and is half as sweet; it occurs naturally in fresh mushrooms, brown algae, tree bark and most fruits and vegetables; it is commercially produced for use in chocolate coatings, confections and chewing gum; its safety has been confirmed by global health authorities; but when eaten in excessive amounts, can cause gastrointestinal discomfort. As a medicine, it is an osmotic diuretic & elevates blood plasma osmolality, resulting in enhanced flow of water from tissues, including the brain and cerebrospinal fluid, into interstitial fluid and plasma. Medically mannitol is a diuretic that is used to reduce swelling and pressure inside the eye or around the brain. (An osmotic diuretic is a type of diuretic that inhibits reabsorption of water and sodium (Na). They are pharmacologically inert substances that are given intravenously. They increase the osmolarity of blood and renal filtrate. Two examples are mannitol and isosorbide). (Osmosis is a process by which molecules of a solvent tend to pass through a semi-permeable membrane from a less concentrated solution into a more concentrated one). So heena is a diuretic (increase urine formation & its output).

- ***Glycosides: -***

Glycosides are organic compound present in plants & animal sources in which sugar group bounded to its carbon are bounded to another functional molecule. When it is hydrolyzed with enzymes give one or more sugar moiety & this is called as glycone. The word glycosides refer to any sugar or group of sugar (lactose, fructose, glucose etc) (please note glucose only is called as glucoside; please see the difference gly & glu).

Main sources of glycosides: -

It is present in many plants, fruit, vegetable & herbs & is called with different name as per present in which plant (example: - glycoside present in senna herb is called as sennosides).

Basic pharmacokinetics of glycosides (based on human intake in natural food products): -

Its absorption, metabolized & excretion are not yet known & are in research.

Basic clinical pharmacology of glycosides: -

It is anti oxidant, anti cancer, anti tumour, anti inflammatory, helpful to liver function, anti viral, anti bacterial, anti fungal, helpful in heart diseases, cardiac arrhythmia, heart failure, congestive heart failure.

- ***<u>Cardiac glycoside: -</u>***

Cardiac glycosides are a class of organic compounds that increase the output force of the heart and increase its rate of contractions by acting on the cellular sodium-potassium ATPase pump. Their beneficial medical uses are as treatments for congestive heart failure and cardiac arrhythmias.

- ***<u>Saponin: -</u>***

Saponins are glucosides with foaming characteristics. Saponins consist of a polycyclic aglycones attached to one or more sugar side chains. The aglycone part, which is also called sapogenin, is either steroid (C27) or a triterpene (C30). The foaming ability of saponins is caused by the combination of a hydrophobic (fat-soluble) sapogenin and a hydrophilic (water-soluble) sugar part. Saponins have a bitter taste. Some saponins are toxic and are known as sapotoxin.

<u>Basic clinical pharmacology of saponin: -</u>

It reduces cholesterol, LDL, increases testosterone, libido & muscle mass; it maintain balance between cellular proliferation & cell death the disturbances in the balance cause severe diseases like cancer etc; it is anti bacterial, anti oxidant, inhibit tumour growth.

- ***<u>Triterpenes: -</u>***

It is a natural group of plant product (saponins); it is of two types simple & complex, simple are components of surface waxes & specialized membranes & act as signaling molecules; complex are glycosylated & provide protection to the plant against pathogen & pests.

<u>Main sources of Triterpenes: -</u>

Olive oil, olive leaves, olive fruits, rosemary, cucumber, it is present in plant surface such as stem bark, leaf, fruit waxes of many plants specially of Lamiaceae family.

<u>Basic pharmacokinetics of Triterpenes (based on human intake in natural food products): -</u>

Before absorption it is hydrolyzed by intestinal enzymes or by bacterial enzymes in large intestine and absorbed; it has low absorption rate; not much is known about its digestion.

<u>Basic clinical pharmacology of Triterpenes: -</u>

It is anti tumour, anti viral, anti bacterial, anti oxidant, anti diabetes, cardio protective, anti obesity, anti cancer, anti ulcer, anti inflammatory, immune-modulator, resolve immune diseases.

- ***<u>Mucilage: -</u>***

Mucilage is a thick, gelatinous substance, gluey substance produced by nearly all plants; *mucilages* are polysaccharides constituted by large molecules of sugars and uronic acids linked by glycosidic bonds; it is edible; used in medicine as it relieves irritation of mucous membranes by forming a protective film. It is known to act as a soluble, or viscous, dietary fiber that thickens the fecal mass. It is present in senna, aloe vera, fenugreek, liqucorice, flex seeds etc.

- ***<u>Tannin: -</u>***

It is of astringent (dry & puckery feeling in mouth) taste, it is a polyphenol present in many plants, fruits, plant's wood, bark, leaves, skin, seeds etc. It is also called as Tannic acid; it is of 2 types hydrolysable & condensed. Hydrolysable is decomposable in water & reacts with water & form other substance. Condensed form is insoluble & precipitates, it is called as tanner's reds. But most of tannic acid is water soluble.

<u>Main sources of tannin: -</u>

It is present berries, apple, barley, nut, tea, legumes, grapes, pomegranate, quince, oak wood, lemons, squash etc.

<u>Basic pharmacokinetics of tannin (based on human intake in natural food products): -</u>

Its absorption, metabolism & excretion are yet not known & are under research. After ingestion its bioavailability is poor due to its large size, high affinity to bound to plasma protein & low lipid solubility. It gets hydrolyzed in glucose & release gallic acid & other compounds upon decomposition.

<u>Basic clinical pharmacology of tannin: -</u>

It is used internally & externally. Externally it cures & heals the condition when applied on cold sores, fever blisters, diaper rashes, bleeding gums, tonsillitis, skin rashes, white discharge, yellow discharge, minor burn etc. It is used as douche for virginal disorders like white or yellow discharge.

In food it is used as flavoring agent & naturally present in fruits etc, it relieves & cures chronic diarrhea, dysentery, hematuria (blood in urine), pain in joints, persist cold, cancers etc, it reduces high blood pressure, high lipids in blood. It is anti aging, anti oxidant, anti bacterial, anti enzymatic. It is used in medicated ointments for piles.

If used excessive it can give toxic effects on skin & internally may reduce absorption of vitamin, cause stomach irritation, nausea, vomiting, liver damage, kidney damage. It should not be used in pregnancy, breast feeding & constipation.

- ***Beta-sitosterol: -***

It is among phytosterols & a main dietary phytosterol found in plants. It is anti cancer, anti inflammatory, it improves urine flow, reduces symptoms of heart diseases, reduces cholesterol, boost immune system, reliefs bronchitis, migraine, asthma, fatigue, rheumatoid arthritis, improve hairs quality, reliefs prostrate problems, improves erectile dysfunctioning, psoriasis, libido.

Main sources of beta-sitosterol: -

Canola oil, avocados, almond, soya bean oil, nuts, vegetable oil, dark chocolate, rice bran oil, wheat germ, corn oil, peanuts, grapes etc.

- ***Gallic acid: -***

It is also known as Trihydroxybenzoic acid, it is a type of phenolic acid; it is a group of hydrolysable tannins. It is used in pharmaceutical industries for various purposes.

Main sources of gallic acid: -

Tea, oak bark, strawberries, grapes, banana, clove, vinegar, gallnuts etc.

Basic pharmacokinetics of gallic acid: -

Its absorption, metabolism & excretion are not known yet and are under research.

Basic clinical pharmacology of gallic acid: -

It is anti viral, anti fungal, anti oxidant, prevents cancers of colon, prostrate, leukemia without harming healthy cells, prevents neural disorders, anti inflammatory, asthma, allergy, rhinitis, sinusitis etc.

- ***Glucose: -***

It is among simple type of natural sugar present in fruits & vegetables; it is a source of energy for our body & related to many function & digestion.

- ***Palmitic acid: -***

It makes up 7% to 13% of extra virgin olive oil; it is a common saturated fatty acid; it is the first fatty acid produced during lipogenesis (fatty acid synthesis) & from which longer fatty acids can be produced.

Main sources of palmitic acid: -

It is present in olive oil, flaxseed oil, soyabean oil, sunflower oil, palm oil, cocoa butter, meat, milk & etc.

Basic pharmacokinetics of palmitic acid (based on human intake in natural food products): -

Its absorption, metabolism & excretion are under research.

Basic clinical pharmacology of palmitic acid: -

It softens the skin & keeps it moist thus good for psoriasis & eczema. It coats the skin, it is powerful anti-oxidant; it maintains the health of hair & skin from aging, cleans them from dirt, sweat, excessive sebum (main cause of acne and boil on face & other parts of the body).

- ***Stearic acid: -***

It makes up 0.5% to 5 % of extra virgin olive oil; it is saturated fatty acid. It is also known as octadecanoic acid.

Main sources of stearic acid: -

It is mainly present in olive oil, also present in butter, whole milk, yeast bread, egg & etc.

Basic pharmacokinetics of stearic acid (based on human intake in natural food products): -

Its absorption, metabolism & excretion are under research.

Basic clinical pharmacology of stearic acid: -

It cleans the skin & removes dirt, sweat & excessive sebum from skin & hair. The colour of olive oil is due to pigments of stearic acid like chlorophyll, pheophytin & carotenoid that's why extra virgin olive oil has colour of its own which refined & pomace do not have.

- ***Dietary fibre: -***

It is an eatable part of vegetables & fruit; our body cannot digest it just passes the small intestines & colon & excrete in stools; it is of two types 1) soluble fibre 2) insoluble fibre.

Soluble fibre dissolve in water & form a gel like material & helps in controlling blood cholesterol & blood glucose; it is found in apple, carrot, barley, oats, peas, beans watermelon etc.

Insoluble fibre do not dissolve & promotes excretion & increase bulk of the stool thus relief constipation & helps in elimination of toxins also. It is found in wheat flour, beans, cauliflower, potato, green beans, watermelon, beetroot, beet leaves etc.

This is the reason it is helpful in constipation conditions, it can eaten in pregnancy to relief constipation and get other benefits of it also.

Basic pharmacokinetics of dietary fibre (based on human intake in natural food products): -

Soluble fibres get dissolve in water & become a gelatinous substance; do not get digested; it helps to slow the digestion & help the body to absorb vital nutrient from eaten food.

Insoluble fibres do not dissolve in water but remain in fibrous form, and do not get digested; it helps the food pass through the digestive system and increase the bulk of stool & eliminate toxins also.

Basic clinical pharmacology of dietary fibre: -

It helps in slow down the digestive process thus gives a good control in blood glucose, improves insulin sensitivity, reduces risk of diabetes, maintains weight, helpful in obesity, reduces blood pressure, reduces cholesterol, reduces inflammation, reduces risk of heart disease, relieves constipation thus helpful in piles, fistula & other rectal disorders & disease, improves bowel movement thus improves bowel health, slowdowns the digestion thus improves quality of digestion, reduces risk of many types of cancer.

- ***Carbohydrate: -***

It is a macronutrient needed by the body, the body receives 4 calories per 1 gram of it; carbohydrates includes sugar, glycogen, starch, dextrin, fibre & cellulose that contain only oxygen, carbon & hydrogen. It is classified in simple & complex; simple carbs are sugar & complex carbs are fibre & starch which take longer to digest. It is basic source of energy for our body.

Main sources of carbohydrates: -

It is present in watermelon (little), potato, sweet potato, bread, oats, butter, white rice, whole grain rice, pasta, lentils, banana, pineapple, quince, cucumber etc.

Basic pharmacokinetic of carbohydrate (based on human intake in natural food products): -

Its digestion begins in mouth; salivary glands releases saliva & salivary amylase (enzyme) which begins the process of breaking down the polysaccharides (carbohydrates) while chewing the food; now the chewed food bolus is passed in stomach through food pipe (esophagus); gastric juice like HCL, rennin etc & eaten material are churned to form chyme in the stomach; the chyme now is passed little by little down into duodenum, pancreatic amylase are released which break the polysaccharides down into disaccharide (chain of only sugars linked together); now the chyme passes to small intestine, in it enzymes called lactase, sucrase, maltase etc breakdown disaccharides into monosaccharide (single sugar) & absorbed in upper & lower intestines, through villi present in small intestine & send into liver through venous blood present into portal veins, as per bodies need it is releases in the blood stream & pancreas release insulin to use it as source of energy for the body, & extra is stored is converted into glycogen by liver & stored in liver & little is stored in muscles & tissues. Liver can reconverts glycogen in to sources of energy if body lacks for other source of energy, the undigested carbohydrates reaches the large intestine (colon) where it is partly broken down & digested by intestinal bacterias, the remains is excreted in stools.

Clinical pharmacology of carbohydrates: -

Carbohydrates are main sources of body energy, it helps brain, kidney, heart, muscles, central nervous system to function, it also regulates blood glucose, it acts on uses of protein as energy, breakdown of fatty acids & prevent ketosis. If we eat less carbohydrate it may lead to hypoglycemia, ketosis, frequent urination, fatigue, dizziness, headache, constipation, bad breath, dehydration etc.

Excessive intake of carbohydrates may lead to vascular disease, atherosclerosis (leads to narrowing of arteries, stroke, diabetes, obesity, fatty liver, blood pressure etc.

- ***Arachidic acid: -***

It is also called as Eicosanoic acid; it is among omega 6 fatty acid; human body uses it as a starting material in synthesis of 2 kinds of essential substances (prostaglandin & leukotrienes both are unsaturated carboxylic acid).

Main sources of arachidic acid: -

It is present in meat, fish, seafood, egg, chicken, peanut oil, corn oil etc.

Basic pharmacokinetics of arachidic acid (based on human intake in natural food products): -

Its absorption, metabolism & excretion are yet not known & are under research.

Basic clinical pharmacology of arachidic acid: -

It is eaten by body builders to gain muscles due to its inflammatory action in the body; it leads to increase production of eicosaniods that help raise immunity, inflammatory response in human body, it also reduces depression, increases lean muscles.

- ***Coumarin: -***

It is oxygen containing heterocyclic compound; it is among polyphenolic compound present in many plants; it is colourless, crystalline phytochemical; it belongs to benzopyrones family; it is found in many essential oils.

Main sources of coumarin: -

Fenugreek, cassia cinnamon, vanilla grass, cucumber etc.

Basic pharmacokinetics of coumarin (based on human intake in natural food products): -

It is absorbed rapidly in small intestines & metabolized in liver, very less is known about its digestion. It is stored in liver, kidney, brain, heart, lungs, muscles; it crosses the blood brain barrier; it is excreted in urine mainly & little in stool.

Basic clinical pharmacology of coumarin: -

It is anti inflammatory, anti tumour, anti bacterial, anti oxidant, anti coagulant etc.

- ***Apigenin: -***

It is a natural flavonoid compound found in many fruits & vegetables serves multiple physiological functions.

Main sources of apigenin: -

It is present in onion, oranges, wheat, tea, grapes, parsley, thyme.

Basic pharmacokinetics of apigenin (based on human intake in natural food products): -

Its absorption, metabolism & excretion are yet not known & are under research.

Basic clinical pharmacology of apigenin: -

It calms the nerves, provides antioxidant effects, prevents & helps the body to fight cancer; it is anti-obesity; neuro-protective, help mood & brain function; reduces cortisol, blood sugar; improves bone, heart & skin health; promotes sleep. It is also anti bacterial, anti viral; reduces blood pressure.

- ***Luteolin: -***

It is a tetra-hydroxy flavone (flavonoids are polyphenolic compounds); a naturally occurring flavonoid

Main sources of luteolin: -

Celery seeds, thyme, green pepper, fenugreek seeds, broccoli, carrot, orange, basil etc.

Basic pharmacokinetics of luteolin (based on human intake in natural food products): -

Its absorption, metabolism & excretion are yet not known & are under research.

Basic clinical pharmacology of luteolin: -

It is famous for activities like anti oxidant, anti inflammatory, apoptosis (inducing & chemo-preventive activities), reduces free radicals, oxidative stress, reduces tumour cell growth & suppresses metastasis & cancer growth.

- ***Oleic acid: -***

Its short hand notation is C18:1, it is a non essential (means it is produce naturally in the body) monounsaturated omega 9 fatty acid, it makes up 55% to 85% or more of extra virgin olive oil, It is insoluble in water & soluble in alcohol. It increases absorption of many drugs through skin by disrupting the lipids under the skin and penetration of the drugs, so olive oil is best to be used with other applications on skin and used in cosmetic formulas. It is advised in Hadith to eat it & massage with it just notice the importance of it.

Main sources of oleic acid: -

It is present in extra virgin olive oil is the best, also present in avocado oil, camellia oil, shea nut oil, apricot oil, sweet almond oil, whole egg, nuts, argan oil etc.

Basic pharmacokinetics of oleic acid (based on human intake in natural food products): -

It is believed that it is absorbed by different tissues mediated via passive diffusion to facilitate diffusion (this is under research) after taken up by the tissues it is stored in the form of natural triglycerides or oxidized, it is transported by lymphatic system; it is also believed to penetrate through skin (it is under research), its excretion is in stool. It is stored 98% in adipose tissues depots in form of triglycerides. Its metabolism & plasma half life is yet not known.

Basic clinical pharmacology of oleic acid: -

It increases bioavailability of following medicines cortisol, hydrocortisone, betamethasone, 17 benzoate betamethasone, 17 valerate (betamethasone), ketarolac (anti inflammatory), metronidazole, progesterone & estradiol. So I advised to mixed powder of prednisolone mixed in extra virgin olive oil and apply on eczema & psoriasis and get good results in cheaper rates.

Oleic acid prevents cardio vascular disease, blood pressure, skin disease, breast cancer, colon cancer, prostate cancer, stomach cancer, diabetes, gall stones, gastrointestinal disease and pancreatic disease. It reduces cholesterol, triglycerides, LDL, inflammation, swelling etc.

- ***Linoleic acid: -***

It is a carboxylic acid, it make up 3% to 15% of extra virgin olive oil, It is polyunsaturated with omega 3 & 6 fatty acids; its short hand notation is 18:2, it is an essential fatty acid that must be consumed for health.

Main sources of linoleic acid: -

It is present in olive oil, evening primrose oil, sunflower oil, walnut oil, hemp oil, grape seed oil, safflower oil, egg yolk, butter & etc.

Basic pharmacokinetics of linoleic acid (based on human intake in natural food products): -

It is first hydrolyzed from dietary fats & pancreatic enzymes & then with the help of bile it is absorbed in small intestine; metabolism & excretion are under research.

It gets converted into gamma linoleic acid (GLA) in the body, GLA is converted in the body into dihomo GLA (20 carbon chain) & it is converted into Arachidonic acid which is converted into docosatetraenoic (long chain fatty acid with 22 carbons) acid.

Basic clinical pharmacology of linoleic acid: -

It acts on prostaglandin system of the body thus is anti-inflammatory, blood thinner, vasodilator (expand the blood vessel) it is very helpful in treatment of rheumatoid arthritis, breast lumps, fibro-adenoma (nodes in breast), cancers, reduces cholesterol, it prevents heart disease, diabetes, skin ulcers, irritable bowel syndrome etc.

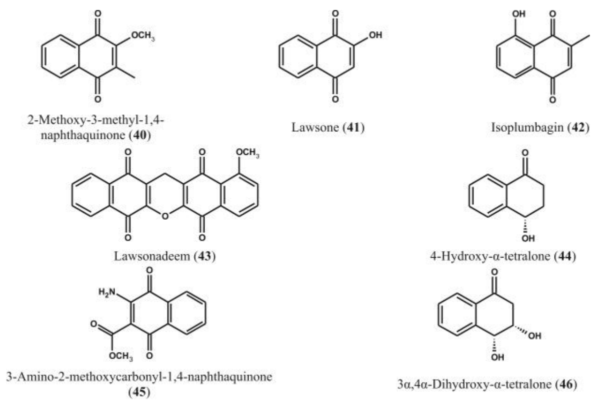
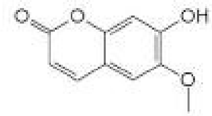
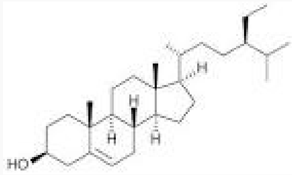
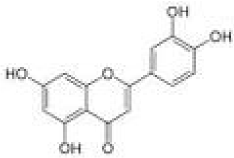
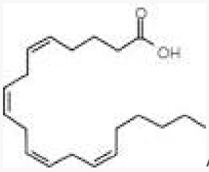
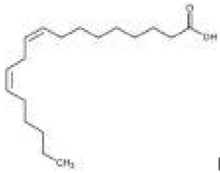
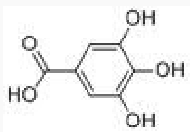
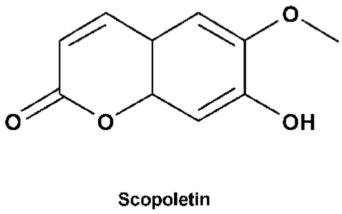


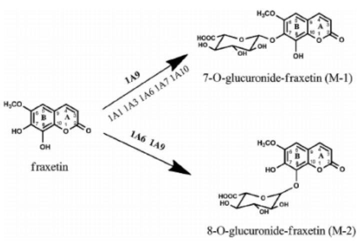
TABLE 2: PHYTOCHEMICAL STRUCTURES PRESENT IN *L. INERMIS* L.

S no.	Chemical Name	Chemical Structure

Scopoletin	 Scopoletin is a coumarin found in root of plants in the genus scopolia.
β-sitosterol	 β-Sitosterol is one of several phytosterols (plant sterols) with chemical structures similar to that of cholesterol. It is used in treating hypercholesterolemia
Luteolins	 Luteolin can be found in *Terminalia chebula*. It is most often found in leaves, but it is also seen in rinds, barks, clover blossom, and ragweed pollen
Arachidic acid	 Arachidonic acid (AA, sometimes ARA) is a polyunsaturated omega-6 fatty acid 20:4(ω-6). It is the counterpart to the saturated arachidic acid found in peanutoil
Linoleic acid	 Linoleic acid belongs to one of the two families of essential fatty acids; it is an unsaturated n-6 fatty acid.
Palmitic acid	Palmitic acid also called hexadecanoic acid, is the most common fatty acid found in animals, plant and microorganism.
Stearic acid	Stearic acid is the saturated fatty acid with an 18-carbon chain and has the IUPAC name octadecanoic acid.
Gallic Acid	 Gallic acid is a trihydroxybenzoic acid, a type of phenolic acid, a type of organic acid, also known as 3,4,5-trihydroxybenzoic acid, found in gallnuts, sumac etc.







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- ***Research: -***

SCIENCE & HADEES REGARDING MEHNDI (HEENA): -

In Hadees it is to apply Heena on hairs & on lesions & also for leg pain: -
It has been clinically proven that applying Heena on lesion like fungal infections, burns, ulcers, cancerous lesions, apthous ulcers, blisters, pricks, nail infections & all types of leg wounds nilgiri or ulcers is very much beneficial & complete healing has been found on regular uses of it. It has soothing effect on pain region & thus reduces inflammation.

- **Heena for cancers:-**

Lawsonia inermis popularly known as Mehndi or Henna, is a cosmetically renowned plant of the oriental region possesses diverse pharmacological activity including anti-carcinogenic, antimicrobial, anti-inflammatory, analgesic, antipyretic, hepato-protective, anti-tuberculostatic. In search of new anticancer drugs from natural sources many researchers have reported anticancer and chemo preventive properties of Henna extracts/compounds in their pre-clinical studies. Lawsone, one of the major constituent of henna, is used as a starting material in the synthesis of a variety of clinically valuable anticancer drugs such as atovaquone, lapachol and dichloroallyl lawsone. It also contain other chemicals such as isoplumbagin, apigenin, apigenin glycosides, luteolin, luteolin-7 glucoside, p-coumarin and lupeol among which many are reported for their cytotoxicity and chemo preventive activity against different type of cancer cell. Future investigation on novel molecules from Mehndi/Henna may offer great hope for discovering new cancer chemotherapeutic and/or chemo preventive agents from this miraculous plant.

- **Heena for hairs: -**

Many researches reveal that Henna is a good source for people who wanted to get rid of their gray hair, and for people who are allergic to chemical cremes. Henna can make your hair strong and nourish it from roots for a silky and shiny hair. It repairs the damaged hair strands and restores the acid-alkaline balance of the scalp. It is an amazing conditioner for hair that protects the hair strands by building a protective layer and locking the nutrients and moisture. It is the best and safest way to color your hair that has no ammonia, chemicals, and toxins. Henna can be used to treat dandruff and scalp infections effectively.

- ***Conclusion: -***

Henna is a super herb not only for external use but for internal use in medicinal dose for various health issues like wounds, lesion, ulcers, burns, cancers, inflammation, infections, obesity, detox etc. One can make a practice to use pure heena powder 1 teaspoon once a week or once in 15 days mixed with 1 teaspoon of honey & drink one cup water on it.

